AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-29 (canceled).

30. (New) A device for an analysis of at least two material samples disposed on a sample plate, the device including:

a carrier for the sample plate;

a contacting mechanism for electrical contacting of the at least two material samples;

a housing carrier;

a measuring head inserted into the housing carrier, wherein the measuring head includes two measuring wires per each material sample for achieving electrical connection to the contacting mechanism, wherein the contacting mechanism lies against contact surfaces of the sample plate with prestressing, and wherein the measuring wires are connected to a measuring and evaluation unit.

31. (New) The device as recited in Claim 30, wherein the measuring wires are connected to fusion balls which function as the contacting mechanism that lies against the contact surfaces of the sample plate.

32. (New) The device as recited in Claim 31, wherein the measuring wires are each connected to a spring contact which ensures a constant contact pressure of the respective measuring wire on the respective contact surface of the sample plate.

33. (New) The device as recited in Claim 32, wherein the measuring head is connected to a gas supply unit.

34. (New) The device as recited in Claim 33, wherein the gas supply unit is connected to a data processing unit of the measuring and evaluation unit.

35. (New) The device as recited in Claim 33, wherein the gas supply unit includes a gas mixing device.

36. (New) The device as recited in Claim 33, wherein the gas supply unit includes a water reservoir.

37. (New) The device as recited in Claim 33, wherein the measuring head includes a gas chamber formed by a substantially bell-shaped distributing device for applying gas to the sample plate, wherein the bell-shaped distributing device is connected to the gas supply unit.

38. (New) The device as recited in Claim 37, wherein a diffuser is situated in the gas chamber.

39. (New) The device as recited in Claim 37, wherein the gas chamber is provided with a gas outlet which is formed by at least one spacer element situated between the sample plate and the distributing device.

40. (New) The device as recited in Claim 37, wherein the measuring and evaluation unit includes two relay switch panels connected to the measuring wires, and wherein each relay switch panel has a 3x64 matrix made up of high-frequency relays.

41. (New) The device as recited in Claim 37, wherein the measuring and evaluation unit includes an impedance analyzer.

42. (New) The device as recited in Claim 37, wherein the measuring and evaluation unit is provided with a measuring

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and control software which transmits data to a relational databank that is linked to an evaluation software.

43. (New) The device as recited in Claim 42, wherein the evaluation software implements a fit functionality for calculating theoretical impedance spectra for a selected individual material sample, wherein the calculation takes place based on a circuit equivalent that includes at least one electronic component.

44. (New) The device as recited in Claim 43, wherein the evaluation software includes a data-mining functionality.

45. (New) The device as recited in Claim 44, wherein the data-mining functionality is implemented by application of multi-dimensional target functions.

46. (New) The device as recited in Claim 45, wherein the data-mining functionality includes a visualizing functionality.

47. (New) The device as recited in Claim 37, further comprising:

a heating device, wherein the sample plate is configured to be inserted into the heating device.

48. (New) A method for performing an analysis of at least two material samples disposed on a sample plate, the method including:

measuring an impedance spectrum for each of the material samples;

storing the measured impedance spectra in one of a data file and a data bank;

determining a configuration of a circuit equivalent as a function of the respective measured impedance spectrum for each of the material samples, the respective circuit

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equivalent including at least one of a resistor and a resistor-capacitor combination element;

determining a starting value required for an error minimization computation for each component of the respective circuit equivalents;

calculating a theoretical impedance spectrum for at least one selected material sample using the error minimization computation, based on the impedance spectrum measured for the at least one material sample and on the starting values for the components of the respective circuit equivalent;

determining fit values for the components of the respective circuit equivalent;

determining a validation magnitude for the calculated, theoretical impedance spectrum; and

determining an evaluation variable by a comparison of at least one of the fit values for the components of the respective circuit equivalent to a reference value.

49. (New) The method as recited in Claim 48, wherein a number of resistor-capacitor combination elements connected in series is determined by taking into consideration a preselected threshold value, and wherein a maximum of four resistor-capacitor combination elements are connection.

50. (New) The method as recited in Claim 49, wherein the starting values for the components of a first resistor-capacitor combination element of the circuit equivalent are ascertained as a function of a maximally measured, imaginary impedance.

51. (New) The method as recited in Claim 48, wherein the error minimization computation is carried out by variation of a dimensioning of the individual components of the circuit equivalent by 1%.

52. (New) The method as recited in Claim 48, wherein in the error minimization computation, an error of the theoretical impedance spectrum is ascertained by analysis of a difference between the theoretical impedance spectrum and the measured impedance spectrum.

53. (New) The method as recited in Claim 48, wherein for each of the material samples, impedance spectra are measured at least one of under different test gas atmospheres and at different temperatures.

54. (New) The method as recited in Claim 48, wherein the evaluation variable for each material sample is written into a data bank, and a data-mining is carried out based on the evaluation variables stored in the data bank.

55. (New) The method as recited in Claim 54, wherein the data-mining is carried out using a target function.

56. (New) The method as recited in Claim 55, wherein the data-mining is carried out using a visual datamining functionality.

57. (New) The method as recited in Claim 48, wherein the measured impedance spectra are at least one of visually checked and evaluated using a control functionality.

58. (New) A computer-readable storage medium containing a program for carrying out a method for performing an analysis of at least two material samples disposed on a sample plate, the method including:

measuring an impedance spectrum for each of the material samples;

storing the measured impedance spectra in one of a data file and a data bank;

Express Mail No.: EV 839713110 US
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determining a configuration of a circuit equivalent as a function of the respective measured impedance spectrum for each of the material samples, the respective circuit equivalent including at least one of a resistor and a resistor-capacitor combination element;

determining a starting value required for an error minimization computation for each component of the respective circuit equivalents;

calculating a theoretical impedance spectrum for at least one selected material sample using the error minimization computation, based on the impedance spectrum measured for the at least one material sample and on the starting values for the components of the respective circuit equivalent;

determining fit values for the components of the respective circuit equivalent;

determining a validation magnitude for the calculated, theoretical impedance spectrum; and

determining an evaluation variable by a comparison of at least one of the fit values for the components of the respective circuit equivalent to a reference value.